Severe Weather Forecast Decision Aid

The Applied Meteorology Unit (AMU) developed a forecast tool that provides an assessment of the likelihood of local convective severe weather for the day in order to enhance protection of personnel and material assets of the 45th Space Wing, Cape Canaveral Air Force Station (CCAFS), and Kennedy Space Center (KSC). The severe weather elements produced by thunderstorms include tornadoes, wind gusts ≥ 50 knots, and/or hail with a diameter ≥ 0.75 inch. Forecasting the occurrence and timing of these phenomena is challenging for 45th Weather Squadron (45 WS) operational personnel. The AMU created an interactive web-based severe weather forecast decision aid to help the forecasters to improve the various 45 WS severe weather watches and warnings. The tool provides severe weather guidance for the day by 7:00 AM local.

In order to develop the decision aid, the AMU evaluated atmospheric stability parameters to determine if they could be used as predictors of severe weather in east-central Florida. They then determined threshold values for the criteria and of the 14 atmospheric stability parameters examined, only 6 showed the potential as guidance to forecasters when considering severe weather in their morning forecast.

These six stability parameters combined with the synoptic scale flow regime, the position of jet streak dynamics, and other criteria were incorporated into an updated 45 WS severe weather checklist which lead to the development of the interactive web-based severe weather forecast decision aid. This interactive tool uses a top-down approach for the forecasters by starting with the big picture weather. The rest of the tool requires the forecasters to think about the local causes of severe weather during the warm season regarding persistence, squall line activity, moisture boundaries, stability parameters, jet dynamics, synoptic flow regime, and sea breeze and boundary collisions. The tool is designed to allow the forecasters to answer Yes/No or enter a stability value for each criterion providing some objectivity to the severe weather forecast. Once all the questions have been answered, a threat score for the day is displayed. The higher the threat score the greater the likelihood of severe weather.

Warm Season Severe Weather Worksheet - Microsoft Internet Explorer

File Edit View Favorites Tools Help

45th Weather Squadron
Warm Season Severe Weather Forecast Tool

ENSCO, Inc.

Fri, 27 May 2005 18:52:55 UTC — Check one box per row.

1. **28 OWS Southeast CONUS Hazard Discussion (AWUS12):** Help
   - Is there a mention of a severe weather threat? Help — Yes ☐ No ☐ Not Sure ☐
   - Was there a severe weather threat mentioned in the previous discussion? Help — Yes ☐ No ☐ Not Sure ☐
2. **KMLB Area Forecast Discussion (FXUS62):** Help
   - Is there a mention of a severe weather threat? Help — Yes ☐ No ☐ Not Sure ☐
   - Was there a severe weather threat mentioned in the previous discussion? Help — Yes ☐ No ☐ Not Sure ☐
3. **Persistence:**
   - Has severe weather occurred in east-central Florida in the last 24 hours? Help — Yes ☐ No ☐ Not Sure ☐
4. **Front or squall line activity:**
   - Has severe weather occurred in northwest Florida in the last 24 hours? Help — Yes ☐ No ☐ Not Sure ☐
   - Is there a front or squall line in northwest Florida moving ESE (morning only)? Help — Yes ☐ No ☐ Not Sure ☐
5. **Water vapor satellite image:**
   - Is there a distinct moisture/dry boundary across central Florida? Help — Yes ☐ No ☐ Not Sure ☐
6. **Sounding/stability parameters:**
   - a. MDPI: ⩽ 1.0 ☐ > 1.0 ☐ Help
   - b. K-Index: < 26 ☐ 26 to 28 ☐ > 28 ☐ Help
   - c. Total Totals: ⩽ 45 ☐ 46 to 48 ☐ > 48 ☐ Help
   - d. Cross Totals: ⩽ 19 ☐ 20 to 21 ☐ 22 to 23 ☐ ⩾ 24 ☐ Help
   - e. Lifted Index: < -5 ☐ -3 to -5 ☐ > -3 ☐ Help
   - f. Showalter Stability Index: < -2 ☐ -2 to 2 ☐ ⩾ 3 ☐ Help
   - g. Thompson Index: < 25 ☐ 25 to 34 ☐ 35 to 39 ☐ ⩾ 40 ☐ Help
   - h. Precipitable Water: < 1.0" ☐ 1" to 1.5" ☐ > 1.5" ☐ Help
   - i. Are the winds veering with height from surface to 10,000 ft? Help — Yes ☐ No ☐ Not Sure ☐
   - j. Is there an inversion below 8,000 ft? Help — Yes ☐ No ☐ Not Sure ☐
   - k. Is the forecast max temp minus sounding conv temp equal to or greater than 5°C? Help — Yes ☐ No ☐ Not Sure ☐
   - l. Is there an 850 mb cap (is the 850 mb temp < 20°C)? Help — Yes ☐ No ☐ Not Sure ☐
   - m. Is the mean RH from 1000 mb to 700 mb equal to or greater than 70%? Help — Yes ☐ No ☐ Not Sure ☐
   - n. Does it look hazy outside? Help — Yes ☐ No ☐ Not Sure ☐
7. **Jet Dynamics**
   - a. Upper-level speed max exit region or divergence over KSC/CCAFS? Help — Yes ☐ No ☐ Not Sure ☐
   - b. Low-level jet with a south to west component from surface to 5,000 ft > 25 kts? Help — Yes ☐ No ☐ Not Sure ☐
8. **Flow Regime Lightning Climatology - See** *Objective Lightning Tool Flow Regimes*
   - a. ☐ SW-1 Help ☐ SW-2 Help ☐ SE-1 Help ☐ SE-2 Help ☐ NW Help ☐ NE Help ☐ Other Help
9. **Sea Breeze and Boundary Collisions** Help
   - a. If a sea breeze forms, will it stay east of I-95? Help — Yes ☐ No ☐ Not Sure ☐
   - b. Are you forecasting a late developing sea breeze? Help — Yes ☐ No ☐ Not Sure ☐
   - c. Are you forecasting or observing multiple boundary collisions? Help — Yes ☐ No ☐ Not Sure ☐

Click here to reset all values to zero — **Total Threat Score:** 0 — Print this page

Local intranet